

1	EDUCATIONAL OR CONSTRUCTION UNITS OR KITS	323.06	.....Piezoelectric element or electrode
300	NON-DYNAMOELECTRIC	323.07	.....Oval track
301	..Nuclear reaction	323.08	.....Armature
302	..Contact potential difference	323.09	.....Pressing means detail
303	..P-N semiconductor	323.11	.....Specific material or composition
304	..Secondary electron emission	323.12	.....Langevin or pencil type motor
305	..Direct charge particle emission	323.13	.....Output member detail
306	..Thermal or pyromagnetic	323.14	.....Roller or ball element
307	..With heat actuated bimetal element	323.15	.....Material or material property
308	..Charge accumulating	323.16	.....Elliptical motion at fixed point (i.e., walking) or Ratchet and Pawl motor
309	..Electrostatic	323.17	....Positions an object
310	...Friction	323.18	....Device performs work on an object (e.g., welding, cutting)
311	..Piezoelectric elements and devices	323.19	....Horn or transmission line
312	..Adding or subtracting mass	323.21	....Detector (e.g., sensor)
313 R	..Surface acoustic wave devices	324	...Diaphragm
313 A	...Orientation of piezoelectric material	325	...Sandwich or Langevin type
313 B	...Interdigitated electrodes	326	..Combined with damping structure
313 C	....Envelope or apodized	327	...On back of piezoelectric element
313 D	....Grating or reflector in wave path	328	..With mechanical energy coupling means
314	..Electrical systems	329	...Including inertia type operator
315	...Temperature compensation circuits	330	...Bending type
316.01	...Input circuit for simultaneous electrical and mechanical output from piezoelectric element	331	....Plural elements
316.02	....Traveling wave motor	332	.....Multimorph
316.03	....Charging and discharging	333	...Shear or torsional type
317	...Input circuit for mechanical output from piezoelectric element	334	...Acoustic wave type generator or receiver
318	...Input circuit for electrical output from piezoelectric element	335	....With lens or reflector
319	...Electrical output circuit	336	....Nondestructive testing type
320	..Piezoelectric slab having different resonant frequencies at different areas	337	....Underwater type
321	..Combined with resonant structure	338	...Force or pressure measuring type
322	...Acoustic wave type generator or receiver	339	...Voltage, spark or current generator
323.01	...Direct mechanical coupling	340	..Encapsulated or coated
323.02	....Motor producing continual motion	341	..With temperature modifier and/ or gas or vapor atmosphere control
323.03	.....Traveling wave motor	342	...For plural piezoelectric elements
323.04	.....Stator	343	...With heating element
323.05	.....Support	344	...Sealed unit
		345	..Supported by elastic material

346	..With temperature compensating structure	26	..Magnetostrictive
347	...Compensated air gap	27	..Fixed and movable wound elements
348	..With mounting or support means	28	..Direct-connected
349	...Air gap	29	...Pivoted or flat-spring armature
350	....Adjustable	30	...Solenoid and core
351	...Suspended by thin member	31	..Self-actuated interrupter
352	....Point contact on major surface only	32	...Pivoted or flat-spring armature
353	....Contact at edges only	33	....Plural armatures
354	...Clamped	34	...Solenoid and core
355	....Spring bias	35	....Successively energized solenoid coils
356	.....90 degrees to major surface and margin clamped only	36	..Oscillating
357	..Orientation of piezoelectric polarization	37	..With motion-converting mechanism
358	...Ceramic composition (e.g., barium titanate)	38	..Direct-connected
359	....More than one poling direction (e.g., Rosen transformer)	39	..With interrupter
360	..Rotation of crystal axis (e.g., cut angle)	40 R	..Rotary
361	...Quartz	40.5	..Self-nutating or moving (e.g., oscillating fan, etc.)
362	...Rochelle salt	41	..With mechanical starters
363	..Electrode materials	42	..With assembling, metal casting or machining feature
364	...Multilayer	43	..Molded plastic
365	..Electrode arrangement	44	..Powdered metal
366	...More than two	45	..Impregnated or coated
367	..Piezoelectric element shape	46	..Magnetic motors
368	...Rectangular plate	47	...Portable or hand tool (e.g., dry shavers)
369	...Circular disc, ring, or cylinder	48	...With other elements
370	... "U" or "tuning fork" shape	49 R	...Step-by-step
371	...Sphere or hemisphere	49 A	....Claw-tooth and printed circuit components
10	DYNAMOELECTRIC	50	..Portable or hand tool
11	..Conducting fluid	51	..Vibration or noise suppression
12	..Linear	52	..Cooling or fluid contact
13	..Fixed and movable wound elements	53	...With control means
14	..Solenoid and core type	54	...Liquid coolant
15	..Reciprocating	55	...Nonatmospheric gas
16	..With cooling or temperature modification	56	...With gas purification or treating
17	..With other elements	57	...Intermediate confined coolant
19	...Speed control or time delay	58	...Circulation
20	...Motion-converting mechanism	59	....Plural units or plural paths
21	....Pivoted or flat-spring armature	60 R	....Self-forced
22	....Plural armatures	61	.....Rotor passage
23	....Solenoid and core type	62	.....Suction pump or fan
24	....Plural cores	63	.....Pressure pump or fan
25	..Reed type	60 A	.....Hollow passages
		64	....Heat-exchange structure

65	.....Spacers (e.g., laminae, coils, etc.)	90.5	....Magnetic bearing
66	..With other elements	91	...Supports
67 R	...Inbuilt or incorporated unit	92	..Torque-transmitting clutches or brakes
67 A	....Bicycle-hub generators	93	...Brake type
68 R	...Electric circuit elements	94	...Automatic control
69	....Shaft-driven switch (e.g., blasting generators)	95	....By speed
70 R	.....Distributor or timer (e.g., ignition magnetos)	96	...With other drive mechanism
70 A	.....Ignition systems	97	....Output bias or resistance device
71	....Connectors, terminals or lead-ins	98	....Drive motor
72	....Impedance devices	99	....Gearing
73	....Illuminating devices	100	....Mechanical clutch
68 A	....Manually operable (e.g., switches, rheostats, etc.)	101	...Plural units
68 B	....Condition responsive (e.g., position, torque, etc.)	102 R	...Generator-motor type
68 C	....Temperature, current-responsive, i.e., protectors	102 A	....Homopolar clutches
68 D	....Conversion elements, (e.g., transformers, rectifiers, etc.)	103	...Magnetic field type
68 E	....Motion responsive (e.g., centrifugal switches)	104	....With air-gap shield
74	...Inertia or fly-wheel device	105	....Induced or eddy current type
75 R	...Drive mechanism	106	.....Magnetic reluctance feature
76	....Brake and clutch	107	.....With collection means for induced current
77	....Brake	108	.....Delivery to external device
78	....Clutch	109	.....Electric motor
79	....Shaft and armature timing or phasing connection	110	.....Impedance
80	....Motion conversion	111	..Generated wave-form modification
81	.....Unbalanced weight (e.g., vibrators)	112	..Plural units, structurally united
82	.....Swash plate	113	...Motor-generator sets
83	.....Gearing	114	..Plural rotary elements
84	.....Impulse coupling	115	...Field and armature both rotate
75 A	....Spring or gravity drive	116	....Limited movement
75 B	....Hand- or foot-operated	117	.....Mechanical bias
75 C	....Rim drive (e.g., bicycle generator drive by wheel, rim, or tire)	118	....With interconnecting drive mechanism
75 D	....Flexible shaft or coupling and hollow shaft drive	119	.....Fluid-drive mechanism
85	...Mechanical shields or protectors	120	.....Friction-drive mechanism
86	....Shield in air gap	121	.....Mechanically controlled element
87	....Submersible	122	.....By additional dynamoelectric machine
88	....Dirt, moisture or explosion proof	123	.....Friction brake
89	....Housings, windows or covers	124	...Plural short-circuited rotary elements
90	...Bearing or air-gap adjustment or bearing lubrication	125	....Squirrel cage type
		126	...Plural armatures in common field
		127	..Plural collector-type machines
		128	...Commutator and slip-ring type
		129	....Synchronous or rotary converter
		130	.....For plural wire D.C. system
		131	....Different armature circuits

132	.....Polyphase armature winding	154.27	.....With an auxiliary pole extending between stator magnet and rotor
133	....Common armature winding		
134	.....With plural field windings	154.28	....Specific magnetization
135	....Commutator in field circuit	154.29	.....Specific position or shape
136	...Plural commutator type	154.31	....Single pole pair
137	....Double current D. C. machines	154.32	.....Permanent magnet extends along an axis
138	.....Dynamotor type		
139	.....Hetero-axial excitation	154.33	.....Plural rotors
140	....Plural armature windings	154.34	.....With adjustable magnetic structure
141	.....Plural field windings	154.35	.....With specific pole pieces or pole shoes
142	....Plural field windings	154.36	.....Circumferentially spaced poles and magnets
143	...Plural slip-ring sets	154.37	.....Poles extending axially from magnets
144	....Plural armature windings		
145	.....Plural sets of poles	154.38	.....Pole shoe shape
146	.....Polyphase windings	154.39	.....Different size
147	.....Slip rings in field circuit	154.41	.....Laminated
148	...Plural sets of brushes	154.42	.....Induced flux return pole
149	....Plural field windings	154.43	....Additional permanent magnets
150	.....Polyphase arrangement	154.44	....Additional shield or coating (non-magnetic)
151	....Short circuiting conductor between brushes	154.45	....Multiple pole pairs
152	..Permanent magnet machines	154.46	.....With specific pole shoe pieces
153	...Inbuilt with flywheel (magneto)	154.47	.....Magnet extending between two poles
154.01	...Permanent magnet stator	154.48	.....Induce flux return pole
154.02	....Combined with generating coil	154.49	.....Adjustable
154.03	....Means for securing magnet	155	....Inductor type
154.04	.....Cantilevered	156.01	...Permanent magnet rotor
154.05	.....Axial	156.02	....Transverse flux
154.06	.....Plural sets of magnets	156.03	....With a hysteresis ring
154.07	.....Adhesive	156.04	....Separate portion of the rotor magnet used as a thrust bearing
154.08	.....Mounted to magnet yoke	156.05	....Separate portion of the rotor magnet used as a magnet for sensing (i.e., for position or frequency)
154.09	.....Split housing/yoke	156.06	....Combined with flux for sensing
154.11	.....Embedded in core or pole	156.07	....Additional flux directing magnets
154.12	.....Cylindrical sleeve holder	156.08	....Mounting (such as on a surface of a shaft)
154.13	.....Holder with pocket for magnet	156.09	.....Keyed to shaft
154.14	.....Spring clip	156.11	.....Magnets in shaft
154.15	.....Clip secured to housing	156.12	.....Mounted on a sleeve/hub
154.16	.....Axially pressing on magnets	156.13	.....Keyed to a sleeve/hub
154.17	.....Wedging between	156.14	.....Knurl between the sleeve/hub and a shaft
154.18	.....With a magnetic wedge		
154.19	.....With an integral wedge		
154.21	....Permanent magnet characterized by the shape of the magnet		
154.22	.....With specific dimension		
154.23	.....Horseshoe		
154.24	.....Bar, square or rectangular		
154.25	.....Disk, ring, or cylinder		
154.26	....With means to prevent or reduce demagnetization (i.e., auxiliary magnetic poles)		

156.15	.....Induced flux pole on sleeve/hub	156.57	.....With slots or holes to guide flux
156.16	.....Spring mounted	156.58	.....Different size pole shoes
156.17	.....Spring mounted flux shunt	156.59	.....Pole shoes fixed to hub or shaft
156.18	.....With a threaded fastener	156.61	.....Pole shoes fixed with end plates
156.19	.....With a wedge	156.62	.....Axially magnetized with poles shoes at one end
156.21	.....With an adhesive	156.63	.....Laminated pole shoes
156.22	.....With an axial end clamp	156.64	.....Axially magnetized with pole shoes at both ends
156.23	.....With casting material around the magnet	156.65	.....Laminated pole shoes
156.24	.....Including a spring mount to adjust a flux	156.66	....Claw poles/interfitting poles/lundel
156.25	.....Axially offset and radially magnetized magnets	156.67	.....Laminated pole shoes
156.26	.....Mounted on a bell shape hub	156.68	.....Poles formed by magnet
156.27	.....Including thermal compensation	156.69	.....Plural sets of claw poles
156.28	.....Sleeve covering magnet face	156.71	.....Claw poles extend in the same axial direction
156.29	.....Sleeve parallel to magnetic face	156.72	.....Additional support for magnet
156.31	.....Banding around magnet	156.73	.....Additional support for claw pole tips
156.32	.....Including an axial air gap	156.74	....Damping features
156.33	.....With pole shoes	156.75	.....Damper plate on magnetic face
156.34	.....With a stator between a rotating flux return plate and rotor magnet	156.76	.....Damper in pole pieces
156.35	.....With single rotor magnet and plural stators	156.77	.....Damper cage around magnet
156.36	.....With plural sets of rotating magnets	156.78	....Squirrel cage
156.37	.....With single stator and plural sets of rotating magnets	156.79	.....Including laminated ring
156.38	....Specific shape	156.81	.....Magnet positioned between squirrel cage and stator
156.39	.....Horseshoe	156.82	.....Axially magnetized magnets or axially positioned magnets
156.41	.....Triangular	156.83	.....Including a flux barrier
156.42	.....Star	156.84	.....Flux barrier is a magnet
156.43	.....Specific magnetization	157	..Vertically disposed
156.44	.....Different pole width	158	..Universal (A.C. or D.C.)
156.45	.....Specific dimensions	159	..A.C.
156.46	.....Shaped to vary air	160	...Frequency converters
156.47	.....Skewed	161	...Phase-shifter type
156.48	....Pole shoes/pole pieces	162	...Synchronous
156.49	.....Radial flux path and radially positioned pole shoes	163	....Reaction type
156.51	.....Laminated pole shoes with multiple pole pairs	164	.....Toroidal coil
156.52	.....Laminated pole shoes with single pole pair	165	....D.C. excited
156.53	.....Embedded in a core	166	...Induction
156.54	.....Induced flux return poles	167	....With repulsion-starting
156.55	.....Circumferential flux path and circumferential pole shoes	168	....Inductor-type generators (variable reluctance)
156.56	.....Embedded	169	.....High frequency
		170	.....Multifrequency
		171	....Induction generators

172	....Shifting field (e.g., shading pole)	212	.....Inherently variable impedance (double squirrel cage)
173	...Commutated	213	...Antiparasitic conductors (imbricated)
174	....Single phase	214	...Coil retainers or slot closers
175	.....Conduction operation	215	...Slot liners
176	.....Transformer operation	216	...Core features
177	..D.C.	217	....Securing laminae
178	...Homopolar	218	....Pole assembly and securing means
179	..Windings and core structure	219	..Current collectors
180	...Field or excitation windings or structure	220	...Spark-reduction
181	....Combined permanent and electromagnet	221	....Arc extinguishers
182	....With short-circuited winding or conductor	222	....Spark-neutralizing current
183	.....Damper winding	223	....Flux compensators
184	....Plural field windings	224	.....Commutating poles or windings
185	.....Plural sets of poles	225	.....Short-circuited coil circuit
186	.....Interpole, compensating or neutralizing poles	226	.....Field-distortion
187	.....Slotted or divided pole	227	...With cooling
188	.....Differentially related	228	...With cleaning, lubricating, resurfacing or repairing
189	....Variable length or tapped winding	229	...Brush-traversing
190	....Magnetic shunts for shifting field flux	230	...Circumferential brush shifting on reversal
191	....Adjustable magnetic structure	231	...Rotary structure
192	....Nonmagnetic inserts or air gaps	232	....Slip rings
193	....Nonuniform core cross section	233	....Commutators
194	....Coil supports and spools	234	.....Winding connectors
195	...Armature or primary	235	.....Molded support
196	....Corona-prevention	236	.....Cylindrical or drum
197	....With short-circuited winding or conductor	237	.....Disc
198	....Plural windings	238	...Fixed structure
199	.....Combined stationary and rotary	239	....Brush holders or rigging
200	....Variable length or tapped windings	240	.....Brush-lifting
201	....Bar windings	241	.....Circumferential adjustment
202	....Open windings	242	.....Brush engagements or guides
203	....Closed windings	243	.....Fluid pressure-operated
204	.....Equalizers	244	.....Brush affixed to pivoted arm
205	.....Multiplex	245	.....Slidable brush
206	.....Lap	246	.....Pressure arm
207	.....Wave	247	.....Axial spring
208	....Coils	248	....Brushes
209	....Adjustable magnetic structure	249	.....With electrical connector
210	...Secondary windings or conductors	251	.....Structure (e.g., composite material)
211	....Squirrel cage	252	.....With composition feature
		253	.....Carbonaceous
		254	..Stator structure
		255	...For railway-type machines
		256	...Stray field flux loss prevention

257	...Interfitting or claw-tooth stators	DIG 3	HALL EFFECT GENERATORS AND CONVERTERS
258	...Frame and core type	DIG 6	PRINTED-CIRCUIT MOTORS AND COMPONENTS
259	....Core assembly		
260	....End turn supports		
261	..Rotor structure		
262	...High-speed rotor type		
263	...Interfitting or claw tooth rotors		
264	...Armatures		
265	....Drum		
266	....Hollow (e.g., double air gap)		
267	....Ring		
268	....Disc		
269	....Salient pole		
270	...End turn supports		
271	...Banding		
272	..Elements		
273	..Miscellaneous		
40 MM	..Miniature motors		

CROSS-REFERENCE ART COLLECTIONS

800 **PIEZOELECTRIC POLYMERS (E.G.,
MYLAR, PVDF)**

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FOR 100 **PERMANENT MAGNET STATOR (310/154)**

FOR 101 **PERMANENT MAGNET ROTOR (310/156)**

DIGESTS

DIG 2 **HYSTERESIS ROTORS AND MOTORS**

